



JAMES A. NOYES, Director

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
www.ladpw.org

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

IN REPLY PLEASE

REFER TO FILE: **EP-2**

April 16, 2003

TO: Each Supervisor

FROM: James A. Noyes
Director of Public Works

RESPONSE TO BOARD OF SUPERVISORS MOTION OF MARCH 18, 2003, SYNOPSIS 67 RADIOACTIVITY AT SELECTED LANDFILLS IN THE COUNTY OF LOS ANGELES

On March 18, 2003, your Board instructed this Department, in coordination with the Department of Health Services and the County Sanitation Districts of Los Angeles County, to report back to your Board within 30 days on the reports requested by the Regional Water Quality Control Board (Regional Water Board), and prepared by the landfill operators, which showed elevated levels of radioactivity including the potential health risks and any safety procedures that should be implemented to protect the citizens of the County.

On April 25, 2002, the State Water Resources Control Board (SWRCB) issued a request for the Regional Water Board to provide basic information on radioactivity characteristics of liquids collected above landfill liner systems and groundwater (background and downgradient) at landfills in the State. As a result of this request, 50 landfills throughout the State were tested for radioactive waste constituents. Four landfills within the County of Los Angeles were selected by the SWRCB for radioactivity monitoring. These are Bradley, Calabasas, Puente Hills, and Sunshine Canyon Landfills.

Attachment A is a report summarizing the results of the sampling tests performed at the four landfill sites and the conclusion of the three noted agencies. The following is a brief synopsis of the report's findings.

Sampling Test Results

The reports prepared by the landfill operators show that certain samples taken above the landfill liners detected radioactive constituents at levels greater than drinking water standards (which are not applicable to landfill liquids) established under current State regulations. The levels of radioactivity found in the liquids within the landfills reflect small amounts of natural radioactivity normally present in the environment and in agricultural and commercial products, and non-natural tritium radioactivity likely originally from common household and commercial luminous products. Those low levels of radioactivity are contained within these landfills using various containment systems. Furthermore, these liquids are managed such that the public does not come into direct contact with, and is not otherwise exposed to, these liquids. Test results show no definitive indication that the landfills are releasing radioactivity to groundwater, and radioactivity levels detected in groundwater samples, both background and downgradient, from these facilities are consistent with natural levels of radioactivity in the environment.

At this time, the SWRCB has not completed its review of the radioactivity monitoring reports. The SWRCB has indicated that its findings may not be ready for three to six months. Consequently, the information and conclusions provided herein may be amended upon the conclusion of the SWRCB's assessment.

Potential Health Risks

Based on the results of the sampling at the four subject landfills, the level of radioactivity detected in groundwater samples downgradient from these facilities is consistent with natural levels of radioactivity in the environment. Therefore, there does not appear to be any public health risk associated with the radioactivity detected within these landfills.

Safety Procedures at the Landfills

To ensure that groundwater is not impacted by landfill liquids, State and Federal regulations require the installation and monitoring of containment systems. These containment features include natural geologic setting, composite liner system, subsurface barrier system, and groundwater monitoring system. Furthermore, each of the landfills operate radioactivity monitors at the facility entrance to detect and exclude radioactive materials that may be present in the waste stream. The radioactivity monitors are highly sensitive for most radioactive materials, although some radioactive

Each Supervisor
April 16, 2003
Page 3

material cannot be readily detected by monitors. The radioactivity monitors are positioned at every scale house of each facility and continuously operate consistent with national standards.

In addition to the radioactivity monitors, the State Governor has declared a moratorium (Executive Order D-62-02 dated September 13, 2002) on the disposal of decommissioned materials into Class III landfills pending the SWRCB's assessment and adoption of regulations on the disposal of decommissioned materials. As a result of the moratorium, the landfill operators have mailed notices to all waste haulers and selected generators and have posted warning signs at their landfills to alert their customers to the Governor's moratorium on the disposal of decommissioned materials.

At this time no additional safety procedures are needed to protect the citizens of the County.

Conclusion

Based on the information provided in the reports submitted by each of the landfill operators to the Regional Water Board and considering that there does not appear to be any identifiable public health risk associated with radioactivity detected at these landfills, we do not have any further recommendations at this time. Upon the conclusion of the SWRCB's investigation we will provide your Board with an update on their findings.

If you have any questions regarding this report, please contact me or your staff may contact Don Wolfe, Assistant Director, at (626) 458-4014, or Shari Afshari, Assistant Deputy Director, at (626) 458-3500.

MA:my
P:\sec\radoactiv

Attach.

cc: Chief Administrative Office
County Counsel
Executive Office
Department of Health Services
County Sanitation Districts of Los Angeles County

**RADIOACTIVITY AT SELECTED LANDFILLS
IN
LOS ANGELES COUNTY**

**Response to Board of Supervisors Motion
March 18, 2003**

**Prepared by
County of Los Angeles Department of Public Works
in cooperation with the
Department of Health Services
and the
County Sanitation Districts of Los Angeles County**

April 2003

ATTACHEMNT A

RADIOACTIVITY SAMPLING AT SELECTED LANDFILLS IN THE COUNTY OF LOS ANGELES

Response to Board of Supervisors Motion March 18, 2003, Synopsis 67

I. BOARD OF SUPERVISORS' ACTION

On March 18, 2003, the Board of Supervisors instructed the Department of Public Works in coordination with the Department of Health Services and the County Sanitation Districts of Los Angeles County to report back to the Board within 30 days on the report requested by the Regional Water Quality Control Board (Regional Water Board) and prepared by the Landfill operators which showed elevated levels of radioactivity in the County, including potential health risks and any safety procedures that should be implemented to protect the citizens of the County.

This report was prepared by Public Works, in coordination with Health Services and the Sanitation Districts, in response to the Board motion.

II. BACKGROUND

In order to determine whether landfills are discharging radioactivity into groundwater, the State Water Resources Control Board (SWRCB) worked with the Regional Water Boards to select a representative sample of municipal landfills throughout the State and collect water quality data on radioactivity.

On April 25, 2002, the SWRCB issued a request for the Regional Water Boards to provide basic information on radioactivity characteristics of liquids collected above the landfill liner systems and groundwater (background and downgradient) at landfills in the State. As a result of this request, 50 landfills throughout the State were tested for radioactive waste constituents. Four landfills within the County of Los Angeles were selected for radioactivity monitoring, namely; Bradley, Calabasas, Puente Hills, and Sunshine Canyon Landfills.

At this time, the SWRCB has not completed its review of the radioactivity monitoring reports. The SWRCB has indicated that its findings may not be ready for another three to six months. Consequently, the information and conclusions provided herein may be amended upon the conclusion of the SWRCB's assessment.

A. Landfill Containment Features

To ensure that groundwater is not impacted by landfill liquids, State and Federal regulations require the installation and monitoring of containment systems. These containment features include:

- Natural geologic setting. To protect groundwater, landfills are typically located on low permeability materials, outside groundwater basins.
- Composite liner systems. To provide waste containment capable of preventing degradation of groundwater, liner systems are installed before waste is deposited. The composite liner system derives its name from the multiple layers of protection afforded by its design. The two main features of a composite liner system are a synthetic flexible membrane component overlaying a compacted clay soil component. Any fluids generated from a landfill are collected above the liner using a Liquid Collection and Recovery System (LCRS).
- Subsurface barrier systems. Prior to the advent of the composite liner, subsurface barriers were typically installed to contain landfill liquids. Each subsurface barrier system includes a groundwater extraction system designed to collect any groundwater that would otherwise build up behind the subsurface barrier. For those areas of the landfill with composite liners, the subsurface barriers serve as a secondary environmental control system.
- Groundwater monitoring systems. The purpose of the groundwater monitoring is to detect any landfill's effect on groundwater quality at the earliest stage such that mitigation measures can be taken to contain the landfill-affected groundwater.

B. Safety Procedures

Each of the landfills operates radioactivity monitors at the facility entrance to detect radioactive materials that may be present in the waste stream. The radioactivity monitors are gamma scintillators that are highly sensitive and easily measure down to background levels.¹ The monitors are positioned at every scale house of each facility and continuously operate consistent with national guidance.²

Infrequently, the monitors detect radiation as a vehicle enters the landfill. In such a case, the vehicle and its driver are inspected. If the driver is the source of radiation, then an interview is conducted to determine whether the driver is being medicated with nuclear pharmaceuticals. If so, the vehicle is released.

¹ Background radiation may fluctuate by a factor of two over short periods, even just a few hours. Because of this variability, very small radiation sources cannot be detected. For example, remediated building material released from a nuclear facility would have at most a radiation level of just one-third of 1 percent of background. Such low levels are not distinguishable from the variations in natural background radiation.

² "Detection and Prevention of Radioactive Contamination in Solid Waste Facilities (Publication 98-3)", Conference of Radiation Control Program Directors.

If the vehicle is the source of radiation, then the load is managed as directed by the Los Angeles County Department of Health Services Radiation Management Section. In most instances, the detected radiation is invariably due to short-lived medical isotopes that after decaying may be safely disposed as ordinary waste.

In addition to the radioactivity monitors, the State Governor has declared a moratorium (Executive Order D-62-02 dated September 13, 2002) on the disposal of decommissioned materials³ into Class III landfills pending the SWRCB's assessment and adoption of regulations on the disposal of decommissioned materials. As a result of the moratorium, the landfill operators have mailed notices to all waste haulers and selected generators and have posted warning signs at their landfills to alert their customers to the Governor's moratorium on the disposal of decommissioned materials.

III. OVERVIEW OF THE RADIOACTIVITY REPORTS

Sampling Protocol

In order to conduct the investigation, the Regional Water Boards require water samples to be obtained from the following sources:

- Landfill liquids (at lined landfills having an LCRS).
- Potentially impacted groundwater wells (those immediate downgradient from waste disposal cells).
- Background (upgradient) groundwater monitoring wells.

The water samples were then to be analyzed for common radioactivity measures such as gross alpha particle activity, gross beta particle activity, and tritium.

In order to characterize naturally occurring levels of radioactivity and to determine if any radioactivity is being released from the landfills, both background wells (unaffected by the landfills) and downgradient wells were sampled for each site. In addition, LCRS samples were collected. The LCRS samples represent liquids contained within the landfill and collected above composite liner system. It should be noted that some radioactivity occurs naturally in rocks, soil, groundwater, surface water, and food. Additionally, low levels of radioactivity are common in fertilizers and some chemicals.

Maximum Contaminant Levels (MCLs) are concentrations for drinking water established by the California Environmental Protection Agency to be protective of human health. Even though the MCLs are not applicable to the landfill liquids, they

³ Decommissioned materials are wastes with extremely low levels of radioactivity that have been released for unrestricted use by the State and Federal governments.

have been used as a reference in order to help evaluate the potential significance of radioactivity found at the four landfills. It is important to note that LCRS samples typically contain chemicals in excess of MCLs, and for that reason, current landfill design standards require containment features, including natural geology, subsurface barrier systems, and liner systems to prevent these liquids from entering waters of the State. In addition, certain radioisotopes can occur naturally at concentrations above the established MCLs.

Sampling Results

The radioactivity results of LCRS and groundwater samples for the four landfills show:

- Certain LCRS samples detected radioactive constituents at levels greater than MCLs, but these liquids are contained within the landfill.
- No indication that the landfills are releasing radioactivity to groundwater.
- Radioactivity levels detected in groundwater samples, both background and downgradient, from these facilities are consistent with natural levels of radioactivity in the environment.

The following presents a summary of the reports prepared by the operators of the four landfills in response to the Regional Water Board's request. Full text of these reports is available for review and inspection during normal business hours at the office of the Department of Public Works, Environmental Programs Division.

A. Bradley Landfill

At the Bradley Landfill, radioactivity test results showed no detection of radioactivity in groundwater above MCLs. Beta activity detected in the LCRS samples is due to the presence of naturally occurring potassium-40. As a result, the beta activity is below the MCL⁴. Tritium levels in the LCRS samples were elevated relative to background concentrations (but were below the MCL). Beta activity and tritium in background and downgradient wells were below the MCL. Sampling results indicate that:

- Beta activity detections are associated with naturally occurring potassium-40 (a beta emitter), which exists in municipal solid waste (e.g. bananas and green wastes), agricultural and commercial products. The specific product responsible for the elevated potassium-40 is

⁴ In accordance with the U.S. Environmental Protection Agency's Radionuclides Rule published in the *Federal Register* on December 7, 2000, the MCL for gross beta particle activity shall be applied to man-made radionuclides. Naturally occurring radionuclides such as potassium-40 and uranium progeny are to be excluded.

unknown, but the elevated potassium-40 is not a health problem due to the body's metabolic control of this essential element⁵.

- Tritium detections are likely associated with household and/or commercial disposal of tritium-containing items⁶ that have fulfilled their useful life, and are contained within the general waste streams.
- There are no indication that radioactivity has been released to groundwater from waste in the Bradley Landfill.

B. Calabasas Landfill

At the Calabasas Landfill radioactivity test results showed detections of certain natural radioactivity measured above MCLs in groundwater and LCRS samples. However, in all cases the levels in downgradient wells were below the levels seen in background wells. Sampling results indicate that:

- Levels of radioactivity (alpha particle activity⁷ and uranium) detected in groundwater and LCRS samples at Calabasas are likely the result of naturally occurring radioactivity found in onsite black shale deposits used for daily cover.
- Beta activity detected in LCRS samples at the Calabasas Landfill are likely associated with naturally occurring uranium. Beta activity in background and downgradient wells was below the MCL.
- Beta activity detections are likely associated with municipal solid wastes particularly food and green wastes⁵ containing natural potassium-40 (a beta emitter).
- There are no indications that radioactivity has been released to groundwater from waste in the Calabasas Landfill.

C. Puente Hills Landfill

At the Puente Hills Landfill radioactivity test results showed no detections of radioactivity in groundwater above MCLs. However, tritium was detected within the landfill in LCRS samples above the MCL. Tritium was not detected in either background or downgradient monitoring wells. Sampling results indicate that:

⁵ National Council on Radiation Protection and Measurements (NCRP) Report No. 94, Exposure of the Population in the United States and Canada from Natural Background Radiation, chapter 7, section 7.2.1, page 109.

⁶ Tritium-containing items include many glow in the dark products which contain either gaseous tritium or luminous tritium-bearing paints (exit signs, watches, electron tubes, street signs, house numbers, light wands, aisle markers, bubble levels, circuit breakers, compasses, depth gauges, telephone dials, fire extinguishers, fishing floats and lures, instrument dials, and weapon sights).

⁷ According to Title 22 of the California Code of Regulations, Section 64443, the MCL for gross alpha particle activity shall exclude uranium. Consequently, gross alpha activity results for the Calabasas Landfill are less than the MCL.

- Tritium detections are likely associated with household and/or commercial disposal of tritium-containing items⁶ that have fulfilled their useful life, and are contained within the general waste stream.
- There are no indications that radioactivity has been released to groundwater from waste in the Puente Hills Landfill.

D. Sunshine Canyon Landfill

At the Sunshine Canyon Landfill radioactivity test results showed no detections of radioactivity in groundwater above MCLs. Beta activity detected in the LCRS samples may be slightly above the MCL⁴. Tritium was detected within the landfill in LCRS samples above the MCL. However, beta activity and tritium in background and downgradient wells were below the MCL. Sampling results indicate that:

- Beta activity detections are likely associated with naturally occurring potassium-40⁵ as verified at the Bradley Landfill, or natural uranium, although analyses to confirm these likelihoods were not conducted at the Sunshine Canyon Landfill.
- Tritium detections are likely associated with household and/or commercial disposal of tritium-containing items⁶ which have fulfilled their useful life, and are contained within the general waste stream.
- There are no indications that radioactivity has been released to groundwater from waste in the Sunshine Canyon Landfill.

IV. CONCLUSIONS

In general, the reports prepared by the landfill operators show that the level of radioactivity detected in groundwater samples from these facilities is consistent with natural levels of radioactivity in the surrounding environment. LCRS samples reflect small amounts of natural radioactivity normally present in agricultural and commercial products, geologic formation, and radioactivity associated with household and commercial luminous products. These low levels of radioactivity are contained within these landfills by various landfill containment systems and do not impact groundwater beneath these sites. Furthermore, the LCRS fluids generated by these facilities are managed such that the public does not come into direct contact with, and is not otherwise exposed to, these fluids. Consequently, there does not appear to be a public health risk associated with the radioactivity detected within these landfills. Therefore, at this time no additional safety procedures are needed to protect the citizens of the County. The information and conclusions provided herein may be amended upon the conclusion of the SWRCB's assessment.

MA:my

P:\sec\radoactivattch